CLAIMS

1. A method for determining field radiation levels for a radiating device comprising determining far field radiation characteristics of a radiating device, providing a model of the radiating device, which model approximates the determined far field radiation characteristics and determining a near field radiation characteristic from the model for at least one point in space.

2. The method as claimed in claim 1 including the step of determining a boundary between the near field and far field radiation of the radiating device.

3. The method as claimed in claim 1 or 2 including the step of determining near field radiation density from the model.

4. The method as claimed in claim 3 including the step of determining power density level over a plurality of positions in space.

5. The method as claimed in claim 4 including the step of determining beam width characteristics of the radiating device in two orthogonal far field radiation patterns.

6. The method as claimed in claim 5 including the step of determining the 3dB beam width in two orthogonal far field radiation patterns.

7. The method as claimed in claim 6 including the step of determining physical characteristics of the radiating device to determine the far field radiation characteristics.

8. The method as claimed in claim 7 including the step of providing a model including representing the device by a plurality of radiation sources.

9. The method as claimed in any one of the preceding claims wherein the radiating device comprises a wire antenna.

10. The method as claimed in claim 9 including the step of providing a model including representing the

radiating device by a plurality of wire elements.

11. The method as claimed in claim 10 including the step of estimating the length and spacing of each wire element forming the radiating device.

12. The method as claimed in claim 11 wherein each wire element is represented as a radiation source.

13. The method as claimed in claim 12 including the step of calculating mutual coupling between all the wire elements.

14. The method as claimed in claim 13 including the step of assembling an N by N impedance matrix and calculating the voltage for each element to determine the current in each element.

15. The method as claimed in claim 14 including the step of multiplying the inverse impedance matrix by the column voltage vector to determine the current in each element.

16. The method as claimed in claim 15 including the step of assigning a Huygen's wavelet point source to each element and calculating the magnitude and phase of each wavelet point source from the current determined.

17. The method as claimed in claim 16 including the step of summing the contribution of each point source to each point in space within the near field.

18. The method as claimed in claim 1, 2 or 3 including the step of providing a single point source for each element with a length less than half a wavelength.

19. The method as claimed in any one of claims 1 to 7 or claim 17 wherein the radiating device is an aperture antenna.

20. The device as claimed in claim 19 including the step of determining the physical characteristics of the radiating device and providing a model including representing the aperture by at least one Huygen's wavelet source.

21. The method as claimed in claim 20 including the step of summing the contribution from each wavelet

source to each point in space.

22. The method as claimed in claim 21 wherein the power density level at any point in space is determined using the formula

$$Pd = \frac{PoweratAntenna * 10^{\frac{Gd+2.15}{10}}}{4\pi Di^2}$$

23. A method of estimating radiation power density of electromagnetic radiation comprising the steps of identifying a radiating device, representing the radiation device as a plurality of point sources which radiate electromagnetic radiation, estimating power density level at a plurality of positions in space for each point source and determining the total power density level at each position, by summing the contribution of each point source to the respective positions in space.

24. The method as claimed in claim 23 including the step of displaying the power density level for a plurality of positions.

25. The method as claimed in claim 24 including summing the power density level determined at each position for all point sources representing the radiating device.

26. The method as claimed in claim 25 including the step of calculating far field and near field tapering characteristics for each position.

27. The method as claimed in claim 26 including the step of calculating the power density level at a point in space by using the power density formula

$$Pd = \frac{PoweratAntenna * 10^{\frac{Gd+2.15}{10}}}{4\pi Di^2}$$

for far field radiation and modifying the far field power density formula for near field radiation, which modification affects the antenna gain, power sent to the antenna and the distance from the antenna to the point source.

28. A method of determining field radiation levels for a radiating device comprising the steps of determining far field radiation characteristics of a radiating device, determining the boundary between near field and far field radiation, determining the displacement of a point in space relative to the closest point on the radiating device and calculating the power density level at the point in space.

29. The method as claimed in claim 28 including the step of modeling the radiating device as a plurality of point sources.

30. The method as claimed in claim 29 including the step of applying a closest point algorithm to determine the power density level at each point in space.

31. The method as claimed in claim 30 wherein the closest point algorithm determines the displacement of the point in space from the closest point on the radiating device.

32. The method as claimed in claim 31 wherein the closest point algorithm calculates X, Y, Z displacement vectors from the point in space to the closest point on the radiating device and calculates azimuth and elevation angles to the closest point.

33. The method as claimed in claim 33 wherein the closest point algorithm determines the orientation of the radiating device and scales the power density level

determined according to the orientation of the radiation device.

34. The method as claimed in claim 34 wherein the closest point algorithm calculates the power density level using the power density formula and incorporates any modification factor applicable if the point in space is in the near field.